

APPLICATION FOR
UNITED STATES LETTERS PATENT

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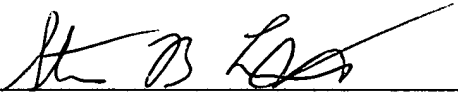
GUN-SHAPED GAME CONTROLLER

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BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to a gaming controller. More particularly, the invention
5 relates to a firearm-shaped gaming controller having selection buttons and character movement controls strategically positioned on the controller.

2. Description of Related Art

In the video gaming industry, conventional computer games are known to use a variety of
10 gaming controllers which allow a player to move and operate a game character in a desired fashion. As computer technology develops in the video gaming area, games are becoming more sophisticated in context. Whereas early video games primarily allowed a player to move within a scripted series of video images, today's games are becoming more interactive allowing a player to simulate action within a three dimensional space.

15 Common gaming controllers, especially for home use, employ a handheld platform having numerous control buttons, directional pads, and/or joysticks positioned on an essentially planar surface. Such platform controllers are commonly used with gaming systems such as X-BOX which is made by MICROSOFT Corporation (Redmond, WA) and PLAYSTATION which is made by SONY Corporation (Tokyo, Japan). While this type of controller may suit a plurality
20 of games, many games employing a game character that is principally moving and shooting a simulated firearm do not closely approximate a realistic experience. Essentially, a handheld platform does not simulate a firearm well. A player using a platform controller for certain types

of games involving the simulated use of firearms will not have a realistic experience. A player using a firearm, specifically a gun-shaped controller, though will have a more realistic experience.

While game controllers in the shape of firearms are known, they have mostly been used
5 in non-interactive gaming scenarios. Usually, gun-shaped controllers have been used with scripted video images. In applying a gun-shaped controller to an interactive gaming scenario has been difficult.

Essentially, a gun-shaped controller employing the control features of the planar
controller has been problematic. Gun-shaped controllers are awkward to use because certain
10 buttons, directional pads, and/or joysticks are not conveniently disposed on the controller. What is needed is a newly designed gun-shaped controller that is efficiently and ergonomically designed to provide a player using the controller a more realistic game experience.

SUMMARY OF THE INVENTION

A gaming system controller shaped as a firearm such as a handgun made in accordance with the present invention is provided with advantageous positioning of buttons, joysticks, and
5 other control apparatus. The gun controller simulates the appearance of an actual handgun such as a pistol with the inclusion of barrel, handle, trigger, and trigger guard. The materials used to fabricate the gun controller may be of any known type utilized in standard electronic game controllers including plastic and metal. Preferably, the gun is fabricated so that it can be used with game systems currently being marketed in place of the game systems' standard platform
10 controller.

The gun controller is ergonomically designed such that a player may control a game character's movement and the aiming of the gun controller while actuating other buttons conveniently located on the exterior portion of the gun. The actuation of the other buttons do not substantially interfere with control of the character's movement or the aiming of the gun
15 because of the ergonomic positioning of the trigger, gun handle, buttons, joysticks, and other control apparatus.

In one embodiment, the aiming control is performed with the use of an optical aiming device employed within the barrel of the gun controller. Essentially, as the barrel is pointed toward a target appearing on the screen of the monitor displaying the game, the optical aiming
20 device senses the general position to where the barrel is being aimed. When the player actuates the trigger, the gaming system controlling the game can determine whether the player has hit the target with a shot.

In other embodiments, the aiming control is performed by the movement of a directional pad or joystick conveniently positioned on the exterior of the gun controller. Most preferably, the aiming controller and movement controller are positioned beneath the trigger guard of the gun controller. Thereby, the player may actuate these controllers with fingers or by resting the
5 controller, particularly the movement controller, on top of the hand that is not wrapped around the gun controller handle. When resting the controller, the player may cause the game character to move by pivoting the movement controller with the movement of the gun controller.

Another gun controller made in accordance with the present invention includes a sub-machine gun format. The buttons and controls may then be deployed near where either hand is
10 holding and supporting the sub-machine gun controller. In a preferred embodiment, the forward handle of a sub-machine gun controller may be provided essentially a handle shaped joystick. Thereby, the player, for example, may cause the game character to move within the game by pivoting and moving the forward handle accordingly.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein:

Figure 1 is a perspective view of a gun-shaped controller in accordance with the present invention;

Figure 2 is a perspective view of a second gun-shaped controller in accordance with the present invention;

Figure 3 is a perspective view of a gun-shaped controller in accordance with the present invention utilizing control pads disposed beneath the trigger housing;

Figure 4 a perspective view of a second gun-shaped controller in accordance with the present invention utilizing control pads disposed beneath the trigger housing;

Figure 5 is perspective view of a third gun-shaped controller in accordance with the present invention utilizing control pads disposed beneath the trigger housing;

Figure 6 is perspective view of another gun-shaped controller utilizing a target tracking system; and

Figure 7 is a side elevational view of a sub-machine gun-shaped controller made in accordance with the present invention.

DETAILED DESCRIPTION

Gun 100, shown in **Figures 1 and 2**, is an embodiment of a game controller made in accordance with the present invention. Therein, gun 100 simulates the appearance of an actual handgun such as a pistol with the inclusion of barrel 110, handle 112, trigger 114, and trigger guard 116. The materials used to fabricate gun 100 may be of any known type utilized in standard electronic game controllers including plastic and metal. Preferably, gun 100 is fabricated so that it can be used with game systems currently being marketed in place of the game systems' standard controller.

As with an actual gun, gun 100 is designed to be held outward with a player's hand when being utilized. In use, gun 100 will be held by a player with one hand positioned about handle 112. Thereby, mock hammer 117 at the end of gun 100 will face the player and muzzle 137 at the front of barrel 110 will be closest to the desired target. To aid in the aiming of gun 100, a forward sight 111 is disposed above and near the terminal end of barrel 110 proximate to muzzle 137, and a rear sight 113 disposed above and near the opposite terminal end of barrel 110.

Several control inputs are provided on handle 112 and barrel 110 for the player to convey instructions the gaming system and its microprocessor operating a game. To allow a player to control features such as having a player's game character jump, change weapons, switch to a different character, punch, kick, use night vision, and the like, gun 100 is designed with a control pad 118 having a plurality of buttons 120. As shown in **Figures 1 and 2**, six buttons 120 are provided on control pad 118 although more or less buttons may be provided depending on the needs of the player to control the game character and the player's game system. Control pad 118

and buttons **120** are preferably positioned on the left side of handle **112** for a right-handed player. Thereby, the player may actuate the button with the player's left hand thumb in an efficient and ergonomic manner.

An optional control pad **122** is shown on gun **100** in **Figures 1 and 2** having control buttons **124**. The location of pad **122** is preferably above and about trigger **114** on the left side of barrel **110**. This position allows the player's left thumb to actuate buttons **124**. Control pad **122** may be provided as in addition to control pad **118** thereby providing the player with a choice as to which control buttons **120** and/or **124** the player finds easier to actuate while playing a game.

Alternatively, buttons **124** may be assigned additional and separate functions to control than buttons **120**. This increases the number of control features a player may control without assigning or at least reducing the number of functions assigned to a single button.

In yet another alternative, a single control pad may be provided with gun **100** as a modular piece to be fitted into a corresponding slot located at about where pad **118** and/or pad **122** is shown in **Figures 1 and 2**. The player may then select the location of the control pad according to the player's preference. Any remaining open slots may be sealed with optional covers.

A movement controller **126** is preferably provided on the left side of gun **100** in a location between trigger **114** and mock hammer **117** in **Figure 1**. Further, controller **126** is disposed within a pad **128** having optional directional markings **130** disposed about controller **126** in a clock-like fashion. Controller **126** may be a directional pad ("D-pad"), thumbpad, or a joystick that when actuated by a player's thumb or finger, preferably the right thumb, in a

desired direction will cause the player's game character to move or appear to move within the game being played. For example, a player may move the character forward, backward, or sideways depending on the game and game system being played.

In addition to having gun 100 simulate a firing with the player's actuation of trigger 114,
5 a secondary weapon button 115 may be provided on gun 100. In Figures 1 and 2, button 115 is located proximate to trigger 114 but may be situated in any other practical location on gun 100. Secondary weapon button 115 may be used to have the game character simulate the firing of a secondary weapon such as, for example, a grenade or flame thrower. Button 115 is positioned behind trigger 114 allowing a player to actuate both triggers with the index finger of the hand
10 holding handle 112.

Along barrel 110 a scroll device pad 132 is provided with scroller 134 for selecting options such as zooming, player stance, and/or menu options. Scroller 134 may be a two-way or four-way directional input device depending on the needs of the game system being utilized.

A signal port 140 located along the base of handle 112 receives signal wire 142.
15 Thereby, gun 100 may communicate with the game system and its microprocessor. While signal port 140 is shown at the base of handle 112, other suitable locations may be employed such as at the bottom 119 of handle 112. In an alternative to the hardwire setup of port 140 and wire 142, gun 100 may be fitted with a wireless communication device using infrared or radio signal to convey control instructions from gun 100 to the game system.

20 Within barrel 110, an optical targeting device 136 is provided. Optical targeting device 136 may be any type similar to those used in prior art video control systems. For example, a photosensor may be incorporated in targeting device 136 within barrel 110. When trigger 114 is

actuated by a player, a microprocessor controlling a game can determine approximately where gun 100 is being aimed by causing the screen to emit a white color in the target area. If the photosensor senses the white color within a specific time frame, then the microprocessor can interpret this as a "hit" depending upon the programming of the particular game. Optical targeting systems for video games are disclosed in U.S. Pat. Nos. 4,813,682 and 4,395,045, which are hereby incorporated by reference.

In an alternative embodiment, the optical targeting system of gun 100 utilizes an automated tracking system. Therein, the game system transmits a short pulse that can be sensed by the optical sensing device in gun 100 to the television or monitor employing a raster scan. Depending upon when the scan is sensed by gun 100, the game system can approximate the targeting area at which the player is aiming. The game system continuously transmits intervals of the short pulse which is detected by gun 100 but infrequent enough so that the player cannot detect the pulse or at least not interfere with the player playing the game. Since the game system can approximate where the player is aiming when pointing gun 100 at the screen of the television or monitor, the game system can show a mark or crosshair on the screen to show the player where gun 100 is being aimed. To facilitate turning, if gun 100 is aimed at a designated portion of the television or monitor such as along the left or right edge, the game system can cause the player's character to approximate a turning motion in the corresponding direction.

Regarding the movement of a game character, gun 100 is not limited to having movement control affixed to the side of the gun. Any location of the movement control is within the scope of the present invention providing that it can be easily controlled by a player's thumb or finger while holding gun 100 at or near a television or monitor displaying the video game. In

Figure 2 movement controller **126**, pad **128**, and optional directional markings **130** have been replaced with movement controller **144**, pad **146**, and optional directional markings **148**.

Movement controller **144** may be a D-pad or a joystick and is positioned above mock hammer **117** for easy control by the player's preferred thumb.

5 While controller **144** is shown positioned along the longitudinal side of gun **100**, other alternatives for the position of controller **144** are possible. One position includes providing a platform extending from or about mock hammer **117** from which controller **144** would be positioned facing downward toward the player's hand. The player may then actuate controller **144** with for example the player's right thumb.

10 In another embodiment, gun **200** is shown in **Figures 3-5** employing an aiming and turning device that is actuated by the player using a joystick, D-pad, thumb pad, or the like. Gun **200** is similar to gun **100** with the exception that an optical targeting device need not be provided within gun **200**.

 Like gun **100**, gun **200** has a barrel **210**, a forward sight **211**, and a rear sight **213**, a
15 handle **212**, a trigger **214**, a trigger guard **216**, a muzzle **237**, and a mock hammer **217**.
 Therewith, gun **200** approximates the appearance of a pistol. A secondary weapon trigger **215** may be provided proximate to trigger **214** for the firing of a secondary weapon. On barrel **210**, a control pad **218** having a plurality of buttons **220** is provided to allow a player to control game character options such as jumping, changing weapons, switching characters, punching, kicking,
20 using night vision, and the like.

 Character movement may be controlled with aiming and turning controller **226** which is L-shaped with the base emanating from socket **228**. At the end of controller **226** farthest away

from socket **228**, a touchpad **230** is provided for the player to actuate controller **226**. As shown, controller **226** essentially follows the front outer edge of trigger guard **216**. A player may actuate controller **226** by allowing touchpad **230** to rest upon the free hand—the hand that is not holding gun **200** by handle **212**.

5 Aiming and turning of the game character is controlled with directing controller **226** in **Figure 3**. Advantageously, the touchpad **230** at the end of controller **226** is positioned beneath trigger guard **216**. In use, the player holds gun **200** by handle **212** with, for example, the player's right hand. The player may then rest touchpad **230** on the left hand, which then acts as a pivot point for gun **200**.

10 In an example of actuating controller **226**, the player holds gun **200** in the player's right hand with touchpad **230** positioned above the player's left hand. As the player moves gun **200** with the right hand, controller **226** is moved in an opposite direction. If gun **200** is moved toward the right of the player, then controller **226** is moved in an inverted movement toward the left. The electronic component of controller **226** may then send a signal to the microprocessor of
15 the game system indicating the movement of controller **226** toward the left. In response, the game system may then move an aiming point or crosshair being projected onto the television or monitor screen toward the right. When the player has the aiming point or crosshair over the desired location on the screen, the gun may stop being pivoted allowing controller **252** to be set to a neutral position.

20 Gun **200** also includes several other components. A scroll device pad **232** is provided with scroller **234** for selecting options along barrel **210**. Signal port **240**, which is located along the base of handle **212**, receives signal wire **242**. Thereby, gun **200** may be in communication

with the game system and its microprocessor. As with gun 100, gun 200 may alternatively relocate port 240 and wire 242 to any viable area on gun 200 to facilitate communication with the game system. Also, gun 200 may substitute a wireless communication device to communicate with the game system. One or more ports 244 and 245 are provided on handle
5 bottom 219 that may be adapted for several uses such as for receiving an optional memory card for the storing of game play, an input/output device for player headset electronics, a communication device for online Internet play, and the like. An alternative location (not shown) for ports 244 is to provide a platform affixed to the bottom of trigger guard 216.

To control movement, a controller 252 is provided emanating from about a middle
10 portion of handle 212 from a socket 254. Further, controller 252 protrudes through opening 253. Like controller 226, controller 252 is L-shaped and has a touchpad 250 that the player may contact to actuate the movement controller 252. Ideally, touchpad 250 is configured to allow the player's middle finger from the hand holding gun 200 by its handle 212 to actuate movement controller 252. Depending on the direction that controller 252 is directed toward, gun 200 will
15 send a signal to the game system to cause the game character to move in accordance.

Gun 200 includes an optional control pad 257 for controlling additional features of the game character, which may include the game character's stance. As a player moves controller 255, which for example may be a D-pad, thumb pad, or joystick, toward a directional indicator 259, the game character may be caused to stand, kneel, or lie down.

20 As an alternative to having movement controller 226 disposed on gun 200 along barrel 210 or handle 212, controller 226 may be eliminated and replaced with a movement controller affixed in other convenient locations. For example, a movement controller may be positioned

under trigger guard **216** in a similar arrangement as controller **260**, pad **262**, and marking **264** while employing the aiming and turning controller **270**, pad **272**, and markings **274**. Thereby, trigger guard **216** would have a movement controller positioned on the bottom beneath and proximate to the bottom of trigger **214** while also having an aiming and turning controller positioned at the front of trigger guard **216**. This layout approximates an L-shape configuration about trigger guard **216**. A player may then control a game character's movement by actuating this movement controller with the middle finger of the hand positioned about handle **212**.

Several examples of alternative positions for the aiming and turning controller and movement controller are shown in **Figures 4 and 5**. In **Figure 4**, an aiming and turning short pad controller **260** and pad **262** are located on the bottom of trigger guard **216**, on electronics space **265**, projecting downward. In this embodiment, a top portion **264** of controller **260** ideally rests upon the free hand and is actuated in a similar manner as touchpad **230**. Along the front portion of trigger guard **216**, a movement controller **270** is provided and emanates from a pad **272** with directional markings **274**. Pad **272** is affixed to the exterior portion of trigger guard **216**. In this configuration, a player may actuate controller **270** with a finger from the free hand. In an alternative embodiment, controller **260** may be a directional pad similar to controller **270**.

In **Figure 5**, movement controller **270**, pad **272**, and markings **274** have been replaced with controller **280**, pad **282**, and markings **284**. Pad **282** is affixed to the side of handle **212** at about a middle point between mock hammer **217** and secondary trigger **215**.

In an alternative movement scheme, the player may control the aiming and turning by using a finger or thumb to actuate controller **260**, which is positioned on the bottom of trigger guard **216** in **Figure 4**. Unlike the inverted movement above, the movement of controller **260**

would produce a standard response. For example, moving controller **260** toward the right would cause the character in the game to move right also. Regardless of the type of movement scheme, the overall movement of controller **260** is preferably kept to a minimum to avoid player fatigue.

Another embodiment of the invention not shown is for the inclusion of an optional video display that may be affixed to the exterior of gun **200** at, for example, video screen port **246** shown in **Figure 5**. The optional video display allows for a gun made in accordance with the present invention to be used for mobile gaming, private, or individual use. Therein, the gun may be provided with a folding video display screen, for example a flip-up LCD screen, that is disposed above barrel **210** between sights **211** and **213**. The folding video screen may be made for attachment only when the player wishes to utilize it or may be permanently affixed. When a player wishes to use gun **200** in an autonomous mode from any external video screen or television, the player would simply extend the optional video display so that the video display is positioned above barrel **210**. For a complete autonomous gaming experience, the game system electronics may be incorporated directly gun **200** including a port installing games or game cartridges, much like a GAME BOY game unit made by NINTENDO Co., Ltd. (Kyoto, Japan).

Another aiming system alternative is shown in **Figure 6** wherein gun **300** remotely controls the aiming and turning of the game character via infrared or radio. Within barrel **310** of gun **300**, a transmitter is provided for providing signal(s) to receivers **322** and **324**. Receivers **322** and **324** are provided around the periphery of screen **330** of television **320**. To measure the horizontal component of movement, a receiver **322** is positioned along the left and right side edges of television **330**. To measure the vertical component of movement, a receiver **324** is positioned along the top and bottom edges of television **330**. When a player moves gun **300**,

receivers **322** and **324** detect the movement by sensing whether the signal is becoming stronger or weaker to a particular receiver. Depending on proportional change, an approximate position of where the player is aiming can be determined by the microprocessor of the gaming system.

Additionally, an optional target or crosshair **332** can be projected on to screen **330**. An

5 imaginary targeting line **331** demonstrates the aiming of gun **300** and the near simultaneous projection of crosshair **331** onto screen **330**. When aiming at the screen is not necessary while playing a game, gun **300** may be directed above or below television **320** and receivers **322** may still control the character's turning by sensing whether gun **300** is being pointed toward the left or right of screen **330**. Thereby, the player will not become fatigued as easily.

10 In addition to having the gun of the present invention shaped as a handgun such as gun **100** or **200**, a submachine gun format may be employed such as submachine gun **400** shown in **Figure 8**. Therein, gun **400** has a main body **402** to which barrel **410**, muzzle **436**, a rear handle **412**, and a forward handle **450** project outward. A primary trigger **414**, secondary weapon trigger **415**, and a trigger housing **416**, which surrounds triggers **414** and **415**, are disposed
15 beneath barrel **410** between handles **412** and **450** along the bottom edge of stock **410**. Along the top edge of gun **400** are a forward sight **411** and rear sight **413** projecting upward to aid the player in aiming gun **400** at a desired target.

To control features of the game, numerous control inputs are provided for the player to operate on the surface of gun **400**. On rear handle **412**, a control pad **418** having a plurality of
20 buttons **420** is provided on control pad **418** to allow a player to control game character options such as jumping, changing weapons, switching characters, punching, kicking, using night vision, and the like. Character movement may be controlled with movement controller **426** that is

disposed on movement controller pad **428** having optional directional markings **430**. Controller **426** as shown may be disposed proximate to mock trigger **417**. A scroll device pad **432** is provided with scroller **434** for selecting options along the side of barrel **410**.

For communication with the game system and its microprocessor, gun **400** is provided with a signal port **440** located at the rear of mock ammunition clip **441** projecting outward from the base of rear handle **412** receives signal wire **442**. As with guns **100**, **200**, and **300**, port **440** and wire **442** may be alternatively positioned at any viable area on gun **400** to facilitate communication with the game system. Also, gun **400** may substitute a wireless communication device to communicate with the game system.

In a preferred embodiment, forward handle **450** is moveable via forward handle connector **452** relative to forward handle receptacle **454** in body **402**. Handle **450** may be provided so as to move in multiple directions including forward, backward, toward the left or right of body **402**, and directions there between. While playing a game, a player holds gun **400** with a stationary handle **412** and may actuate handle **450** relative to the pivot point formed at receptacle **454**. In one embodiment, a player may control weapon aiming and character turning by moving handle **450** in a desired direction.

A further use of moveable handle **450** may be realized with the use of an optical aiming and turning system as set forth for guns **100**, **200**, and **300**. An optical aiming system may be provided in gun **400** in barrel **410** with the optical sensor positioned at about muzzle **436**. Handle **450** is then assigned to control the game character's movement as an alternative or replacement for movement controller **426** and movement controller pad **428**.

While guns **100**, **200**, and **300** are shown with all control features being disposed on the

left side of the devices for right-handed players, it should be understood that guns 100, 200, and 300 can be manufactured for left-handed players simply by switching the control features to the right side. One embodiment of the invention not shown is to provide the control features as separate modules that may be affixed to respective receptacles provided on guns 100, 200, and 300. The modules may be inserted prior to using guns 100, 200, or 300 by the player according to the player's preferences. To cover the open receptacles, fitted plates may be provided to attach to the openings if desired.

Advantageously, the game control devices of the present invention allow a player to control movement and the aiming and turning of the game character and its weapon. This is an improvement over standard games employing a gun-like controller. These types of standard games typically allow a player to control only the aiming and targeting of the game character's weapon. With a gun of the present invention, a player will be able to play a game that would be otherwise be played using a standard two-hand controller such as those used with PLAYSTATION made by SONY Corporation (Tokyo, Japan) or X-BOX made by MICROSOFT Corporation (Redmond, WA). Thereby, a player may experience a more realistic gaming experience when playing shooting type games.

Furthermore, the present invention has applications beyond entertainment purposes. With the advantageous control features, guns in accordance with the present invention may be used by the police and military in order to simulate shooting situations. This may provide personnel with experience and education without the need to provide a full-scale simulation or war game.

While the invention has been particularly shown and described with reference to a

preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.